

Office of Environmental Management Safety Alert Preventing Contact With Overhead Lines

December 2005

Purpose:

This Alert is to recommend additional requirements to prevent the contacting of overhead electrical lines by equipment when performing Environmental Management (EM) work.

Background:

Since January 2004, at least 15 cases have been documented in EM in which equipment either came in contact with overhead lines or came so close that there was arcing. The equipment that made contact included cranes, dump and trash trucks, excavators and forklifts.



Fig 1. September 21, 2005 event at RL. Driver exited the vehicle without waiting for the line to be de-energized.

Not one of the workers were injured or shocked in any of these cases. However, each of the cases represented a potentially fatal outcome. In each EM case it is disturbing to find a case documented in OSHA where the outcome was fatal. The following figures describe some fatal overhead line contact at non-Department of Energy (DOE) sites:



Fig 2. Two workers fatally electrocuted working on the grader in the center. The grader was rented by a sub and

broke down under the power line. The rental company handled the repair. One worker had over 20 years experience repairing vehicles at construction sites.



Fig3. Fatal drilling operation near power lines. The close proximity is obvious in this picture, but was not for the operator

Discussion:

OSHA has a minimal set of requirements that apply to working in the vicinity of energized overhead lines. For construction and maintenance activities they are:

Transit - Equipment not carrying out its intended function is in transit and may not come closer than 4 feet of an energized overhead line.

Standoff Distance - Equipment working near energized overhead lines may not approach closer than 10 feet (this distance increases as the voltage increases above 50 kilovolts).

Trained Operators - Operators of equipment working near energized overhead lines need to be trained in the hazards of energized electrical lines.

The OSHA requirements are also prefaced with a discussion that makes it clear, the first choice should always be to de-energize the line. Not one of the EM cases describes why it was necessary to work in close proximity to an energized line. It is not apparent that EM contractors give serious consideration to de-energizing an overhead line.

EM has been unable to consistently maintain the standoff distance due to several factors including:

Office of Environmental Management Safety Alert

Preventing Contact With Overhead Lines

December 2005

untrained spotters and operators; spotters that were distracted; spotters and operators that were unable to visually discern the necessary equipment clearance, and operations proceeding without effective communication.

Actions:

In order to improve our performance in maintaining an effective standoff distance, EM strongly recommends the implementation of a two barrier control system.

Two barrier control systems provide defense in depth by requiring more than one preventative system to fail. For the purpose of maintaining the minimum standoff distance, contractors would be required to utilize two means of control. Reasonable examples that each field office could approve include, but are not limited to:

1. *Trained spotters* – spotters trained in the techniques of visually determining standoff distance and in radio communication with the operator.
2. *Physical boundaries* – barriers that prevent the equipment from intruding within the standoff distance.
3. *Demarcation lines* – stakes or painted lines that provide constant reminders to equipment operators of the proximity.
4. *Measurement of the overhead line and equipment clearance* – utilizing remote, not direct, measurement techniques to determine the actual clearance distance.
5. *Use of reflective materials* - enhancing visual identification of spotters by equipment operators.

Each field office should approve acceptable methods of applying the two barrier system.

Several aspects of work with overhead lines would also benefit from improvements in reporting and documentation. Many of the key requirements that should already be in place for work with overhead lines flow directly from a sound ISMS program and should include:

1. Work areas are walked down by planners and workers to identify overhead line hazards.
2. If there are circumstances that preclude de-energizing the line, those reasons should be documented in the work planning process and approved at the appropriate management level.
3. Consistent with OSHA requirements, the first preference shall always be to de-energize the line.
4. Work that is performed near lines that are not de-energized shall be carried out under a two barrier control system to maintain the standoff distance.
5. DOE Field Managers, Federal Project Managers, Facility Representatives and other staff should evaluate performance against these requirements in walkthroughs and other surveillance activities.
6. In the event the line is inadvertently contacted, the reasons the line could not be de-energized and performance against these policy requirements should be summarized in the ORPS report.